IN THE CLAIMS

1. (Currently amended) In a computerized device, a method for administering software storage area network management modules that operate as part of a storage area network management software application, the method comprising the steps of:

operating a module server to service a plurality of different storage area network management modules that each provide a respective type of management functionality for elements operating within a storage area network associated with the computerized device, the ~~management sever~~ module server lacking administration capability of the plurality of different storage area network management modules;

operating an administration module in conjunction with the module ~~sever~~ server, the administration module providing a plurality of module administration interfaces that can be remotely invoked to administer the plurality of different storage area network management modules;

receiving a remote invocation of at least one of the plurality of module administration interfaces to remotely administer at least one of the storage area network management modules serviced by the module server; and

applying module administration functionality associated with the at least one remotely invoked module administration interface to remotely administer at least one of the storage area network management modules serviced by the module server.

2. (Original) The method of claim 1 wherein the plurality of module administration interfaces include:

i) at least one installation interface having associated module administration installation functionality allowing remote installation and removal of storage area network management modules operating in the storage area network management application in the computerized device;

ii) at least one activation control interface having associated module administration activation control functionality allowing remote control of operation of installed storage area network management modules operating in the storage area network management application in the computerized device; and

iii) at least one description interface allowing remote access to descriptive information related to the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device.

3. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a deploy module interface call identifying:

i) module metadata indicating operational attributes associated with a module to be installed and deployed for operation with the module server;

ii) a module file list identifying module files to be installed for operation of the module to perform storage area network element management tasks associated with that module; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

executing the module administration deployment functionality associated with the deploy module interface call to install the module files identified in the module file list for runtime access by the storage area network management application for operation with the module server; and

configuring operational attributes indicated in the module metadata to allow the module server to properly operate in conjunction with the installed storage area network management module files to allow operation of the module to manage elements in the storage area network.

4. (Original) The method of claim 3 wherein the operational attributes indicated by the metadata include an activate on demand attribute that is set to indicate whether that storage area network management module is to be activated for operation with the module server on demand when a request for that module is received by the storage area network management application.

5. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a remove module interface call to the at least one module installation interface, the remove module interface call identifying at least one module to be removed from installation and operation with the module server within the storage area network management application; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

determining if the module to be removed is currently installed for operation with the module server, and if so:

    i)   removing the module from installation with the module server; and

    ii)   deleting files listed in a module file list, received when the module was installed, the module file list identifying module files to that were installed for operation of the module to perform storage area network element management tasks associated with that module.

6. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a deactivate module interface call to the at least one activation control interface, the deactivate module interface call identifying at least one module to be deactivated from operation with the module server within the storage area network management application; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

determining if the module to be deactivated is currently active for operation with the module server, and if so deactivating the module from operation with the module server.

7. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a disable on demand activation module interface call to the at least one activation control interface, the disable on demand activation module interface call identifying whether a module identified by the disable on demand activation module interface call is to be deactivated from automatic operation with the module server when that module is requested for service within the storage area network management application; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

disabling the ability of the module server to automatically load and dynamically link the module identified by the disable on demand activation module interface call.

8. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving at least one description interface call to the at least one description interface, the at least one description interface call requesting remote access to descriptive information related to at least one of the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

returning descriptive information related to at least one of the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device.

9. (Original) The method of claim 8 wherein the at least one description interface call is a module metadata list call requesting access to module metadata for at least one installed module that operates in conjunction with the module server; and

wherein returning descriptive information comprises:

transmitting module metadata to a device that provided the at least one description interface call, the module metadata indicating operational attributes associated with a module deployed for operation with the module server.

10. (Original) The method of claim 8 wherein the at least one description interface call is a describe module call requesting a module descriptor associated with a module that is installed to operate with the module server and that is identified by a module identification specified in the describe module call; and

wherein returning descriptive information comprises:

transmitting the module descriptor associated with the module identification, the module descriptor providing a description of the module, a status of whether the module is enable for activation upon startup of the module server, and a published name by which the module may be accessed for storage area network element management functionality by an application providing the describe module call.

11. (Original) The method of claim 8 wherein the at least one description interface call is a interoperable object reference call requesting access to at least one interoperable object reference associated with at least one module that is installed to operate with the module server and that is identified by a module identification specified in the interoperable object reference call; and

wherein returning descriptive information comprises:

transmitting the at least one interoperable object reference to an application that provided the at least one interoperable object reference call, the at least one interoperable object reference operating as an identification of the module for use by storage area network management applications.

12. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a module container state interface call to the at least one activation control interface, the module container state interface call identifying a module container state that configures a container state associated with the module to become at least one of:

i) a discarding state in which the module discards incoming storage area network element management requests;

ii) a non-discarding state in which the module processes incoming storage area network element management requests for management of elements in a storage area network; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

configuring the container state associated with the module based on module container state identified in the module container state interface call.

13. (Original) The method of claim 2 wherein receiving a remote invocation of at least one of the plurality of module administration interfaces comprises:

receiving a module service home identification call to the at least one activation control interface, the module service home identification call identifying a module installed for operation with the module server and identifying at least one storage area network management console operating in a storage area network management computer system with which the module is to operate under for receipt of storage area network element management commands; and

wherein applying module administration functionality associated with the at least one remotely invoked module administration interface comprises:

configuring the module service home identification associated with the module based on module service home identification identified in the module service home identification interface call such that the module communicates with the identified at least one storage area network management console.

14. (Currently amended) A computerized device comprising:

a communications interface;

a memory;

a processor;

an interconnection mechanism coupling the communications interface, a memory and a processor;

wherein the memory is encoded with a storage area network management application code including an administration module that when executed by the processor, produces a storage area network management process that administers storage area network management modules by performing the operations of:

operating a module server to service a plurality of different storage area network management modules that each provide a respective type of management functionality for elements operating within a storage area network associated with the computerized device, the ~~management sever~~ module server lacking administration capability of the plurality of different storage area network management modules;

operating the administration module in conjunction with the module ~~sever~~ server, the administration module providing a plurality of module administration interfaces that are software interfaces that can be remotely invoked to administer the plurality of different storage area network management modules;

receiving a remote invocation, over the communications interface, of at least one of the plurality of module administration interfaces to remotely administer at least one of the storage area network management modules serviced by the module server; and

applying module administration functionality associated with the at least one remotely invoked module administration interface to remotely administer at least one of the storage area network management modules serviced by the module server.

15. (Original) The computerized device of claim 14 wherein the plurality of module administration interfaces include:

i) at least one installation interface having associated module administration installation functionality allowing remote installation and removal of storage area network management modules operating in the storage area network management application in the computerized device;

ii) at least one activation control interface having associated module administration activation control functionality allowing remote control of operation of installed storage area network management modules operating in the storage area network management application in the computerized device; and

iii) at least one description interface allowing remote access to descriptive information related to the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device.

16. The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operations of:

receiving a deploy module interface call identifying:

i) module metadata indicating operational attributes associated with a module to be installed and deployed for operation with the module server;

ii) a module file list identifying module files to be installed for operation of the module to perform storage area network element management tasks associated with that module; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operations of:

executing the module administration deployment functionality associated with the deploy module interface call to install the module files identified in the

module file list for runtime access by the storage area network management application for operation with the module server; and

configuring operational attributes indicated in the module metadata to allow the module server to properly operate in conjunction with the installed storage area network management module files to allow operation of the module to manage elements in the storage area network.

17. (Original) The computerized device of claim 16 wherein the operational attributes indicated by the metadata include an activate on demand attribute that is set to indicate whether that storage area network management module is to be activated for operation with the module server on demand when a request for that module is received by the storage area network management application.

18. The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving a remove module interface call to the at least one module installation interface, the remove module interface call identifying at least one module to be removed from installation and operation with the module server within the storage area network management application; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operations of:

determining if the module to be removed is currently installed for operation with the module server, and if so:

i)   removing the module from installation with the module server; and

ii)   deleting files listed in a module file list, received when the component was installed, the module file list identifying module files to that were

installed for operation of the module to perform storage area network element management tasks associated with that module.

19. (Original) The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving a deactivate module interface call to the at least one activation control interface, the deactivate module interface call identifying at least one module to be deactivated from operation with the module server within the storage area network management application; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, wherein when the storage area network management application performs the operation of:

determining if the module to be deactivated is currently active for operation with the module server, and if so deactivating the module from operation with the module server.

20. (Original) The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving a disable on demand activation module interface call to the at least one activation control interface, the disable on demand activation module interface call identifying whether a module identified by the disable on demand activation module interface call is to be deactivated from automatic operation with the module server when that module is requested for service within the storage area network management application; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operation of:

disabling the ability of the module server to automatically load and dynamically link the module identified by the disable on demand activation module interface call.

21. (Original) The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving at least one description interface call to the at least one description interface, the at least one description interface call requesting remote access to descriptive information related to at least one of the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operation of:

returning descriptive information related to at least one of the installed storage area network management modules operating in conjunction with the module server in the storage area network management application in the computerized device.

22. (Original) The computerized device of claim 21 wherein the at least one description interface call is a module metadata list call requesting access to module metadata for at least one installed module that operates in conjunction with the module server; and

wherein when the storage area network management application performs the operation of returning descriptive information, the storage area network management application performs the operation of:

transmitting module metadata, over the communications interface, to a device that provided the at least one description interface call, the module metadata indicating operational attributes associated with a module deployed for operation with the module server.

23. (Original) The computerized device of claim 21 wherein the at least one description interface call is a describe module call requesting a module descriptor associated with a module that is installed to operate with the module server and that is identified by a module identification specified in the describe module call; and

wherein when the storage area network management application performs the operation of returning descriptive information, the storage area network management application performs the operation of:

transmitting the module descriptor associated with the module identification, the module descriptor providing a description of the module, a status of whether the module is enable for activation upon startup of the module server, and a published name by which the module may be accessed for storage area network element management functionality by an application providing the describe module call.

24. (Original) The computerized device of claim 21 wherein the at least one description interface call is a interoperable object reference call requesting access to at least one interoperable object reference associated with at least one module that is installed to operate with the module server and that is identified by a module identification specified in the interoperable object reference call; and

wherein when the storage area network management application performs the operation of returning descriptive information, the storage area network management application performs the operation of:

transmitting the at least one interoperable object reference to an application that provided the at least one interoperable object reference call, the at least one interoperable object reference operating as an identification of the module for use by storage area network management applications.

25. (Original) The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving a module container state interface call to the at least one activation control interface, the module container state interface call identifying a module container state that configures a container state associated with the module to become at least one of:

i) a discarding state in which the module discards incoming storage area network element management requests;

ii) a non-discarding state in which the module processes incoming storage area network element management requests for management of elements in a storage area network; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operation of:

configuring the container state associated with the module based on module container state identified in the module container state interface call.

26. (Original) The computerized device of claim 15 wherein when the storage area network management application performs the operation of receiving a remote invocation of at least one of the plurality of module administration interfaces, the storage area network management application performs the operation of:

receiving a module service home identification call to the at least one activation control interface, the module service home identification call identifying a module installed for operation with the module server and identifying at least one storage area network management console operating in a storage area network management computer system with which the module is to operate under for receipt of storage area network element management commands; and

wherein when the storage area network management application performs the operation of applying module administration functionality associated with the at least one remotely invoked module administration interface, the storage area network management application performs the operation of:

configuring the module service home identification associated with the module based on module service home identification identified in the module service home identification interface call such that the module communicates with the identified at least one storage area network management console.

27. (Currently amended) A computerized device comprising:

a communications interface;

a memory;

a processor;

an interconnection mechanism coupling the communications interface, a memory and a processor;

wherein the memory is encoded with a storage area network management application code including an administration module that when executed by the processor, produces a storage area network management process that includes a means for administering storage area network management modules, such means including:

means for operating a module server to service a plurality of different storage area network management modules that each provide a respective type of management functionality for elements operating within a storage area network associated with the

computerized device, the ~~management sever~~ module server lacking administration capability of the plurality of different storage area network management modules;

means for operating the administration module in conjunction with the module ~~sever~~ server, the administration module providing a plurality of module administration interfaces that are software interfaces that can be remotely invoked to administer the plurality of different storage area network management modules;

means for receiving a remote invocation, over the communications interface, of at least one of the plurality of module administration interfaces to remotely administer at least one of the storage area network management modules serviced by the module server; and

means for applying module administration functionality associated with the at least one remotely invoked module administration interface to remotely administer at least one of the storage area network management modules serviced by the module server.

28. (Currently amended) A computer program product having a computer-readable medium including storage area network management application computer program logic code encoded thereon that, when performed in a computerized device, provides a storage area network management process that operates as a storage area network management application to administer storage area network management modules via the operations of:

operating a module server to service a plurality of different storage area network management modules that each provide a respective type of management functionality for elements operating within a storage area network associated with the computerized device, the ~~management sever~~ module server lacking administration capability of the plurality of different storage area network management modules;

operating the administration module in conjunction with the module ~~sever~~ server, the administration module providing a plurality of module administration interfaces that are software interfaces that can be remotely invoked to administer the plurality of different storage area network management modules;

receiving a remote invocation of at least one of the plurality of module administration interfaces to remotely administer at least one of the storage area network management modules serviced by the module server; and

applying module administration functionality associated with the at least one remotely invoked module administration interface to remotely administer at least one of the storage area network management modules serviced by the module server.